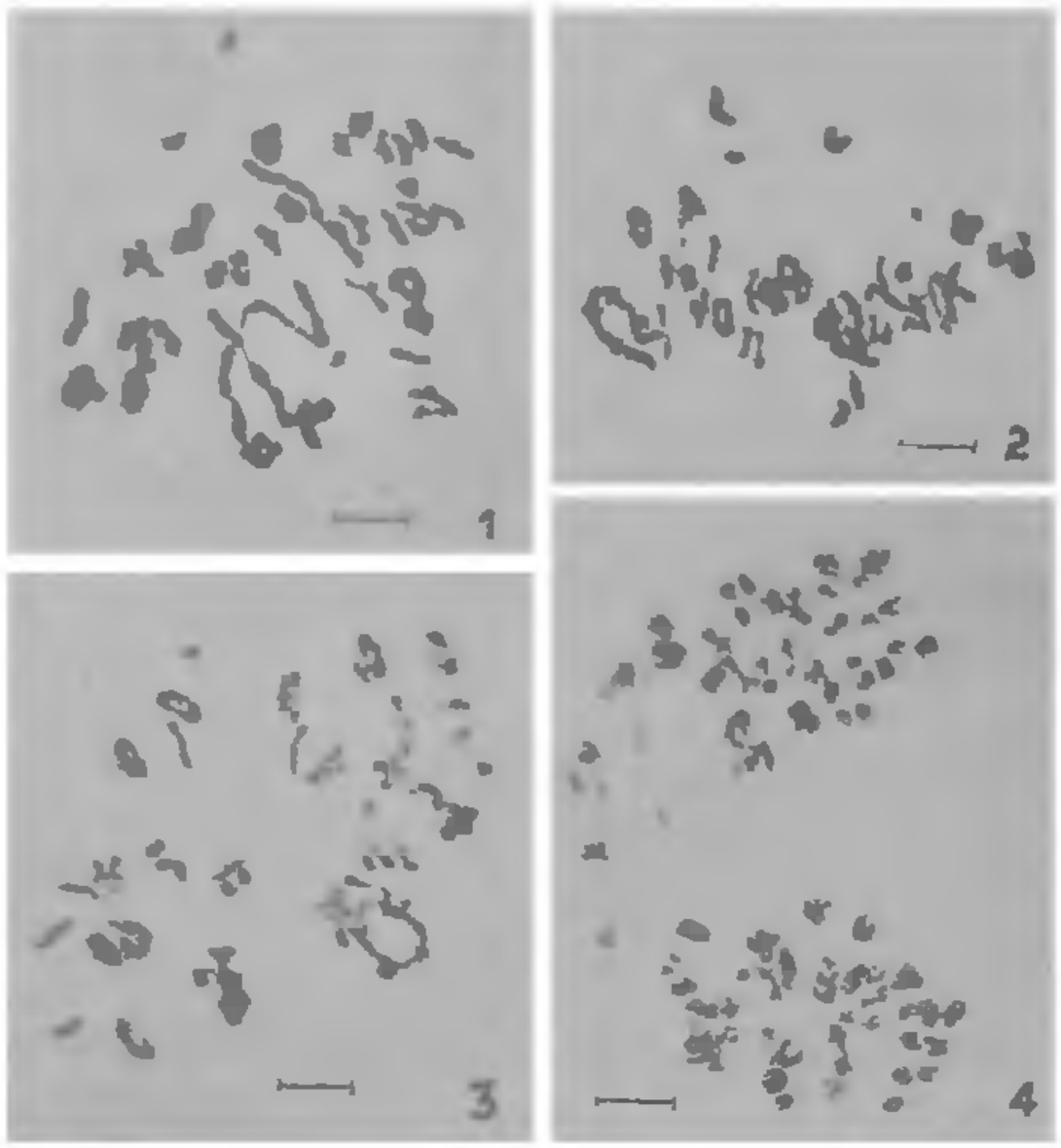

Figures 1–4. Stages of male meiosis in octoploid *G. simplex*. **1.** M I showing 1 VIII + 2 IV + 34 II + 4 I. **2.** M I showing 4 IV + 34 II + 4 I. **3.** M I showing 3 IV + 37 II + 2 I. **4.** A I showing 41 : 4 : 43 distribution. Note the chromatid bridge. (scale 10 μ)

inspite of the possible genetic homology[7]. As such, pairing behaviour cannot always be taken as an index of the nature of polyploidy.

The present record of octoploidy alongwith earlier reports of diploidy and tetraploidy indicate that a polyploid series exists in *G. simplex*. Same is the case with other species, *G. superba, G. carsonii* and *G. rothschildiana*, in which different euploid numbers have been recorded from time to time[2–4]. Polyploidy thus seems to have played a prominent role in the evolution and distribution of this genus. Perpetuation of polyploids, in spite of irregular meiosis, is ensured through vegetative propagation by tubers.

18 March 1985

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RUBBERY WOOD—A HITHERTO UNRECORDED DISEASE OF CITRUS

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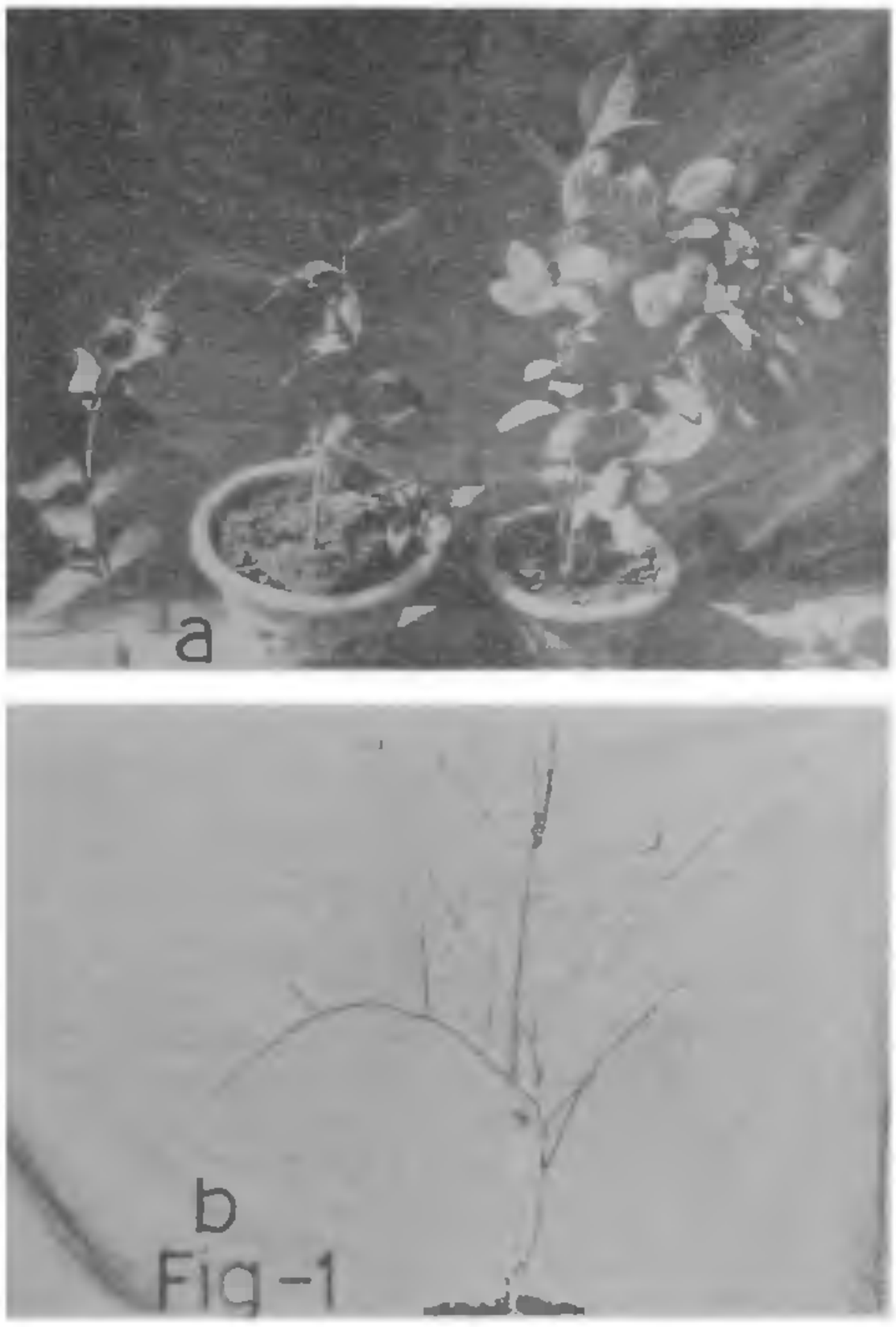
A DISEASE with unusual flexibility of branches of a Lisbon lemon tree was observed in Darjeeling hills as early as 1973[1]. During later surveys, a similar disease was observed in Rajasthan and Assam. In one orchard at Kota, the incidence of the disease as high as 50% was observed in Kagzi lime. The affected trees were characterised with bending of their shoots towards ground and the affected branches were unusually flexible or elastic. The affected trees were totally unproductive. Since no fungus or bacterium could be isolated from highly diseased samples, the disorder was considered to be caused by virus-like organism. Results of transmission studies are presented here.

Samples collected earlier from Darjeeling hills, when wedge-grafted to Lisbon lemon, developed numerous flexible branches in 60% of the inoculated plants in the glasshouse at Kalimpong. Samples obtained from Rajasthan and Assam were indexed at IARI, New Delhi.

Ten plants of Kagzi lime and five of Eureka lemon were wedge-grafted and maintained in the glasshouse for observation. Suitable controls were maintained for the experiment. In the host range studies, five plants each of Khasi mandarin, mosambi (sweet orange), Rangpur lime, sweet lime and sour orange were wedge-grafted with diseased scions.

In lime and lemon, the first visible symptom of the disease appeared as bending of the main shoot towards ground after one year of inoculation. The disease was transmitted to 70 and 40% of inoculated lime and lemon plants respectively. After two years of infection, inoculated plants developed willowing habit due to elasticity in their branches (figure 1a). The leaves showed veinal and interveinal chlorosis and a habit of downward and inward curling. Leaf lamina was much reduced as compared to healthy control. During the following years, numerous thin branches



Figures 1a–b. a. Right: healthy lemon plant, Left: lemon plant infected with rubbery wood after one year. **b.** Lemon plant three years after infection showing defoliation and die-back symptoms. Numerous branches develop at right angle.

developed from the curved main shoot at right angles (figure 1b). The leaves of such branches fell down and plants developed dieback symptoms. Swelling of buds was also noted in inoculated Eureka lemon plants. However, no symptoms developed in inoculated plants of mosambi, Rangpur lime, sour orange and sweet lime and also control plants. In Khasi mandarin, flexibility of branches was observed but severity of the disease was less as compared to Kagzi lime and lemon. The disease was back-transmitted from lime, lemon and Khasi mandarin on to healthy Eureka or Lisbon lemon.

The disease was not transmissible by mechanical inoculations from glasshouse-infected plants to Eureka lemon, Kagzi lime and 30 plant species of herbaceous hosts. It could also not be transmitted by aphids, *Myzus persicae* and *Aphis gossypii*.

More than 10 years of studies on this malady suggest that this is one of the serious diseases of lime and lemon plantations in the country. It needs special attention as the affected trees become completely unproductive and die within few years after infection. Since no such malady of citrus is known in the literature, it has been considered to be a new disease of citrus caused by virus-like pathogen and tentatively named as 'Rubbery-wood'. Further studies are in progress.

28 March 1985

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LOSS OF IONS IN PEARL MILLET SEEDS TREATED WITH HONEYDEW OF *CLAVICEPS FUSIFORMIS* LOV.

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PEARL MILLET (*Pennisetum americanum* L (Leeke) ergot (*Claviceps fusiformis* Loveless)[1,2] is a national problem in India. Though elaboration of unidentified phytotoxins by the fungus in culture media[3] and presence of toxic metabolites in sclerotial filtrate have been reported[4], the earliest effects of toxic metabolites of fungus origin detectable through the electrolyte leakage pattern of the tissues after treatment with toxins[5–7] have not been investigated. This note reports the permeability changes in seed and leaf tissues after treatment with toxins.

Honeydew collected 4 days after its appearance on artificially inoculated earheads of pearl millet hybrid BJ 104, was centrifuged in a refrigerated centrifuge at 20,000 r.p.m. at 4° C for 15 min. The supernatant was collected and diluted (1:5). This served as a crude toxin preparation, hereafter referred to as honeydew toxin (HDT). The grains (2.5 g) and 1-cm-diameter leaf discs (500 mg) were weighed and treated with HDT or glass-distilled water (GDW) for 15 min. The treated materials were thoroughly washed with GDW and were immediately suspended in 100 ml GDW. The conductivity of ambient solutions was recorded at 0 hr and then after every 30 min for 2 hr on a direct reading